REMARKS

Claims 1, 5, and 7 are currently pending in this application and are unamended. No new matter has been added by this Request for Reconsideration.

Rejections Under 35 U.S.C. § 112

Claims 1, 5 and 7 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement because the claims purportedly claim subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, the Examiner states that the original Specification does not disclose that the trip algorithm computer (TAC) receives the safety parameters "through said TGC," but rather, the original Specification discloses on page 7 that the TAC receives plant operation parameters directly from the environmental neutron flux monitoring system, the remote stop panel and the core protection calculation system. The Examiner also states that the original Specification does not disclose the expected signal pattern is "to be input from said VAC by using the test signal position bit which is input through the VAC from the TGC."

The Applicants respectfully traverse the rejection under 35 U.S.C. § 112, first paragraph, for the reasons that follow.

The Applicants have previously amended the Specification to correct an inadvertent error on pages 7 and 11 of the original Specification in an Amendment filed August 14, 2004. Namely, the term "TAC 120" was erroneously and inadvertently used instead of "TGC 110" in the sentence "[i]f the test is automatically initiated, the ~~TAC 120~~ TGC 110 receives plant operation parameters as an input signal from an environment neutron flux monitoring system (ENFMS),...." (Page 7). Additionally, the term "TAC 120" was also erroneously and inadvertently used instead of "TGC 110" in the sentence "[a]lso, it receives position information of the test trip signal for self-diagnosis generated by the ~~TAC 120~~ TGC 110 and then outputs it to the PRC 140." (Page 11). This amendment is supported in the original Specification at, for example, page 6, lines 10-13, which includes, *inter alia*:

> The signals inputted into the four independent channels are inputted to the TAC 120 via the TGC 110. Here, the TGC 110 is an integral portion of a digital online active test according to the present invention, which generates a test input and a test signal position bit. [Underline emphasis added]

Thus, no new matter was added to the Specification by the prior amendments. Accordingly, it is respectfully submitted that the rejection of claims 1, 5 and 7 under 35 U.S.C. § 112, first paragraph, has been effectively overcome and should be withdrawn.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1, 5 and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,664,870 ("Hager"). It is the Examiner's position that Hager discloses a plant protection system in a nuclear power plant including a test generating computer (TGC) for generating a test input for self-diagnosis, a trip algorithm computer (TAC) for receiving the safety parameters via a plurality of measuring channels which are physically and electrically isolated from each other, a voting algorithm computer (VAC) for receiving a trip state of each safety parameter, and a pattern recognition computer (PRC) for expecting a signal pattern to be input from the VAC based on the test input signal. The Examiner acknowledges that Hager does not disclose stopping the reactor if the comparison is not consistent, but the Examiner takes the position that Hager discloses reporting malfunctions if the comparison is not consistent and that it would have been obvious to stop the reactor if the comparison of Hager was not consistent in order to prevent the reported system malfunctions of Hager from damaging the system or causing harm.

The Applicants respectfully traverse the rejection of claims 1, 5 and 7 for at least the following reasons.

Present Invention

The present invention is directed to a digital online active test-plant protection system (DOAT-PPS) in a nuclear power plant. The DOAT-PPS includes a test generating computer (TGC) for generating a test input for self-diagnosis. The test input is inserted between actual safety parameters as a test parameter and a test signal position bit indicates position information of the test input, and therefore, testing occurs during actual operation. The DOAT-PPS also includes a trip algorithm computer (TAC) for receiving the safety parameters through the TGC from a plurality of measuring channels which are physically and electrically isolated from each other and then compares the safety parameters and predetermined limit values of the safety parameters to determine a trip state of the safety parameter, if there is a test input by the TGC. The DOAT-PPS also includes a voting algorithm computer (VAC) for receiving a trip state of each of the safety parameters determined by the TAC in each of the channels, determining a final state of each of the safety parameters and then outputting the result. The DOAT-PPS further includes a pattern recognition computer (PRC) for expecting a signal pattern to be input from the VAC by using the test signal position bit which is input through the VAC from the TGC, comparing the signal pattern on a one to one basis with the result determined by the VAC and then if the signal pattern and the result are not consistent, determining to trip the reactor.

Hager

Hager discloses a protection system for a "complex process control system" which generates three independent actuation signals. The power interface circuit or power interface 13 includes three pairs of switches 15 arranged in three parallel groups 19 of switches 15 connected in series with the load 11, 11′ and a voltage source V. Each group 19 of switches includes two switches 15, 15′ selected from different pairs of switches 15, 15′ and connected in series. Normally closed switches 15 are used with normally energized loads 11 (Fig. 2) and normally open switches 15′ with normally de-energized loads 11′ (Fig. 3). Logic gates 23, 31 control actuation of each individual switch 15, 15′ in response either to an associated actuation signal or a test signal generated by a microprocessor 21. The microprocessor 21 generates a sequence of patterns of test signals (col. 6, Tables I & II) which result in various combinations of switch

actuations. The current through each group A, B, C of switches 15, 15′ resulting from each combination of switch actuations is compared by the microprocessor 21 with expected values to evaluate circuit performance. Thus, the test signal is inputted to a power interface 13. An output from the power interface 13 is detected by a detector 27 (CM1, CM2, CM3). The microprocessor 21 receives the output signal from the detector 27, and evaluates the performance of the power interface 13 by comparing the output signal with the test signal. Thus, Hager is either in a test mode or an operational mode, and therefore, cannot test during operation.

Patentability of Claim 1

Claim 1 recites, *inter alia*:

> a trip generating computer (TGC) for generating a test input for self-diagnosis, said test input being inserted between actual safety parameters as a test parameter and a test signal position bit indicating position information of the test input....

Hager fails to disclose or suggest a trip generating computer for generating a test input for self-diagnosis where the test input is inserted between actual safety parameters as a test parameter at a test signal position bit indicating position information of the test input. As discussed above, the signal in Hager is inputted to the power interface 13, and thus, the system can only test the power interface 13, not all of the components of the protection system. Further, Hager either is in normal operational mode or test mode, but fails to insert a test input between actual safety parameters as claimed in claim 1. Beacause Hager is either in a test mode or an operational mode, Hager cannot test during operation.

The present invention, as set forth above, is a method for testing the operation of all of the components of the reactor including the TGC, TAC, VAC and PRC. A test input is inserted between actual safety parameters as a test parameter and an abnormal parameter being detected. Therefore, if an actual abnormal parameter is received in the reactor protection system, the parameter can be detected accurately. It is also possible to monitor the state of all of the components as well as all of the types of errors.

To establish *prima facie* obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. MPEP § 2143.03. Further, the mere fact that the prior art could be modified in the manner proposed by the Examiner does not make the modifications obvious unless the prior art suggests the desirability of the modification. MPEP § 2143.

As discussed above, Hager fails to disclose or suggest that the test generating computer generates a test input for self diagnosis and the test input is inserted between actual safety parameters as a test parameter along with the test signal position bit indicating position information of the test input, as also claimed in independent claim 1. It is therefore, respectfully submitted that claim 1 is not *prima facie* obvious over Hager. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103(a) of claim 1 should be withdrawn.

Patentability of Claim 5

Claim 5 recites, *inter alia*:

> a first step of generating, in a test generating computer (TGC), a test input for self diagnosis, said test input being inserted between actual safety parameters as a test parameter and a test signal position bit indicating position information of the test input,...

As mentioned above with respect to claim 1, Hager fails to disclose, teach or suggest in a test generating computer (TGC), a test input for self diagnosis, said test input being inserted between actual safety parameters as a test parameter and a test signal position bit indicating position information of the test input. Hager discloses a system that can only test the power interface 13, not all of the components of the protection system. It is therefore, respectfully submitted that claim 5 is also not *prima facie* obvious over Hager. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103(a) of claim 5 should be withdrawn.

Patentability of Claim 7

Claim 7 is directed to a control program that includes nearly identical steps as set forth above with respect to claim 5. Accordingly, for all the reasons set forth above with respect

to claim 5, claim 7 is also not *prima facie* obvious over Hager. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103(a) of claim 7 should be withdrawn.

CONCLUSION

In view of the foregoing Remarks, it is respectfully submitted that the present application, including claims 1, 5 and 7, is in condition for allowance and such action is respectfully requested.

Respectfully submitted,

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